Docket No.: 246980US0DIV

OBLON
SPIVAK
McCLELLAND
MAIER
&
NEUSTADT
P.C.
ATTORNEYS AT LAW

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

RE: Application Serial No.: 10/765,152
Applicants: Wilfried HEIDE, et al.
Filing Date: January 28, 2004
For: CONTINUOUS PRODUCTION OF CROSSLINKED FINE PARTICLES OF POLYMER GEL
Group Art Unit: 1713
Examiner: EGWIM, K. C.

SIR:

Attached hereto for filing are the following papers:

Appeal Brief

Our credit card payment form in the amount of **$500.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon

Stefan U. Koschmieder, Ph.D.
Registration No. 50,238

Customer Number
22850
(703) 413-3000 (phone)
(703) 413-2220 (fax)

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
WILFRIED HEIDE, ET AL.	: EXAMINER: EGWIM, K. C.
SERIAL NO: 10/765,152	:
FILED: JANUARY 28, 2004	: GROUP ART UNIT: 1713
FOR: CONTINUOUS PRODUCTION OF CROSSLINKED FINE PARTICLES OF POLYMER GEL	:

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Further to the Notice of Panel Decision of December 8, 2006, the Pre-Appeal Brief Request for Review of November 8, 2006, and the final Office Action of September 11, 2006, Applicants request review of the rejections of the above-identified application by the Board of Patent Appeals and Interferences.

I. REAL PARTY IN INTEREST

The real party in interest is BASF Aktiengesellschaft of Ludwigshafen Germany.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIMS

Claims 10-36 are pending. Claims 13-14 and 36 are withdrawn from consideration. Claims 10-12 and 15-35 are rejected claims. Claims 1-9 are canceled. The rejection of Claims 10-12 and 15-35 is appealed.

IV. STATUS OF AMENDMENTS

No amendment was filed subsequent to the November 11, 2006 final Office Action. The amendment filed on June 8, 2006 was entered and considered. No other amendments are pending. Claims 11-12, 15-22 and 24 are original claims. Claims 10, 23 and 25-35 are previously presented claims.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 10 is drawn to a process for the continuous production of cross-linked fine particles of an addition polymer gel. The process of independent Claim 10 includes copolymerizing a monomer mixture in the presence of an initiator by continuously feeding an aqueous solution of the monomer mixture into a mixing kneader having at least two axially parallel rotating shafts having a plurality of kneading and transporting elements. The copolymerizing is described at page 3, line 25 through page 5, line 17. The mixing kneader recited in Claim 10 is described at page 6, line 38 through page 7, line 13. The addition of a monomer solution to a kneading reactor is described (page 10, lines 5-10). Operation of a reactor (e.g., a mixing kneader) is disclosed at page 10, lines 20-29.

Claims 16-23 require that minimum amounts of the heat of reaction (e.g., the heat evolved by the copolymerizing) are removed by product discharge and/or water evaporation. The removal of the heat of reaction is described at page 7, lines 15-27.

Claim 24 requires that no heat is removed by cooling of the reactor walls (see page 7, lines 29-30).

Claims 25-29 recite different aspects of the structure of the parallel rotating shafts of the mixing kneader. The rotating shafts of the mixing kneader are described in the specification on page 6, line 38 through page 7, line 1.

Claims 30-32 require certain residence times for the monomer mixture in the mixing kneader (see page 7, lines 38-46).

Claims 33-35 limit the amount of the residual monomer present in the polymerized product (e.g., the addition polymer gel). Table 2 on page 13 of the specification describes the results of Examples 3-5. Examples 3-5 have residual amounts of the monomer corresponding to the maximum amounts recited in Claims 33-35.

VI. GROUNDS OF REJECTION

A) Claims 10-12, 24-26 and 33-35 are rejected as anticipated under the meaning 35 U.S.C. § 102(b) in view of a patent to Tsubakimoto (U.S. 4,625,001). The Office asserts that Tsubakimoto teaches a continuous process for polymerizing an aqueous solution of unsaturated monomers in a mixing kneader containing at least two counter-rotating screws/shafts with kneading elements wherein the heat of polymerizing is dissipated through evaporation/vaporization, discharged products and the reactor walls (see paragraph no. 4 on page 3 of the Office Action of June 16, 2005).

Applicants submit that the Office's assertion that the prior art of record discloses the mixing kneader recited in the present claims is not correct.

B) Claims 15-23 and 27-32 stand rejected as anticipated under the meaning 35 U.S.C. § 102(b) or, in the alternative, obvious under the meaning 35 U.S.C. § 103(a) in view

of the Tsubakimoto patent. The Office asserts that even though the prior art does not "expressly measure" the percentage of heat loss from evaporation in comparison to the percentage of heat loss from discharged products "it is reasonable that the percentages of heat loss would be the same ... since the continuous process ... of the prior art is essentially the same" (see paragraph no. 6 on page 4 of the June 16, 2005 Office Action).

Applicants submit that the Office's assertions are incorrect at least because the mixing kneader of the claimed invention is not essentially the same as the reactor of Tsubakimoto.

VII. ARGUMENTS

Rejection of the Claims under 35 U.S.C. §102(b)

Independent Claim 10

Independent Claim 10 is drawn to a process that includes copolymerizing a monomer mixture by continuously feeding an aqueous solution of the monomer mixture into a mixing kneader "having at least two axially parallel rotating shafts having a plurality of kneading and transporting elements to convey the monomer mixture from an upstream end of the mixing kneader in the axial direction toward a downstream end of the mixing kneader by the continuous conveying action of the transporting elements of the rotating shafts" (see Claim 10).

Applicants submit that Tsubakimoto does not disclose a mixing kneader having at least two axially parallel rotating shafts having a plurality of kneading and transporting elements, much less the use of such a mixing kneader to convey a monomer mixture in an axial direction from an upstream location to a downstream location of the kneader.

The Office is of the opinion that Figures 4 and 5 of Tsubakimoto describe the mixing kneader of present Claim 10 (see paragraph no. 8 on page 3 of the September 11, 2006 Office

Action). For example, the Office asserts that reference numerals 26 and 29 of Figures 4 and 5 represent parallel rotating shafts that function to axially convey a monomer mixture from an upstream location to a downstream location. Applicants submit the Office's characterization of the prior art is not correct. The shafts identified by reference numeral 26 are explicitly described as "stirring shafts." The single shaft identified by reference numeral 29 is identified as a "discharge screw" (see column 5, lines 32-36 of Tsubakimoto).

Thus, Tsubakimoto does not disclose at least one of the limitations of the present claims; namely, a mixing kneader having at least two axially parallel rotating shafts having a plurality of kneading and transporting elements. At best, Tsubakimoto discloses an apparatus having a single rotating shaft with transporting elements. Tsubakimoto clearly does not disclose an apparatus having a plurality of rotating shafts with transporting elements.

Because Tsubakimoto does not disclose at least one of the limitations of present independent Claim 10, Tsubakimoto cannot anticipate independent Claim 10.

Claim 24

Tsubakimoto discloses embodiments wherein the heat of polymerization is removed by condensing water vapor formed during the polymerizing, see column 4, lines 30-44. Further, Tsubakimoto describes the prior art kneader as one that is capable of removing heat. For example, Tsubakimoto discloses the following at column 4, lines 38-42:

> For the purpose of heating the aqueous monomer solution or partially removing the heat of polymerization reaction during the polymerization, it is desirable to provide the polymerization vessel with a jacket.

Applicants submit that Tsubakimoto does not disclose an embodiment wherein no heat removal occurs by cooling of the reactor walls with sufficient specificity to constitute anticipation. Thus, the rejection of Claim 24 as anticipate over Tsubakimoto should be withdrawn.

Claim 26

Further with regard to the structure of the mixing kneader, Applicants submit that Tsubakimoto nowhere discloses the axially parallel rotating shafts of Claim 26. For example, Tsubakimoto does not describe axially parallel rotating shafts that include a combination of kneading and transporting elements. Thus, Tsubakimoto cannot anticipate Claim 26 and the rejections should be withdrawn.

Claims 33-35

Claims 33-35 limit the amount of residual monomer that may be present in the polymerized product. Applicants submit that Tsubakimoto nowhere discloses or suggests such polymerization. In fact, Tsubakimoto even goes so far to disclose that the polymerized product of the prior art process must undergo further treatment in order to obtain better conversion of the monomer to the polymer. See for example column 8, lines 50-56:

> In the actual working of this invention, the conversion of the monomer to the polymer can be improved by heating the water-containing gel polymer freshly discharged from the polymerization vessel before the polymer is dried. For this particular embodiment of this invention, union of a continuous heater and a continuous drier may be contemplated.

Applicants submit that the above-quoted disclosure of Tsubakimoto proves that the low residual monomer of the present claims is not an inherent feature of the prior art process otherwise post-treatment of the prior art product would not be necessary. Thus, the rejection of Claims 33-35 as anticipated should be withdrawn.

Rejection of the Claims under 35 U.S.C. §102(b) or in the alternate 35 U.S.C. §103(a)

Claims 16-23

Claims 16-23 limit the amount of heat that is removed by product discharge and water evaporation or by cooling of the reactor walls (e.g., the walls of the mixing kneader). The Office already conceded that Tsubakimoto discloses polymerizations that are carried out in mixing kneaders wherein the heat is dissipated through evaporation/vaporization (see the last sentence of paragraph no. 4 on page 3 of the June 16, 2005 Office Action), e.g.:

> The polymerizations are carried out in mixing kneaders comprising at least two counter rotating screws/shafts with kneading elements and the heat is dissipated through evaporation/vaporization, discharged products, and the balance, if any, through the reactor walls over the period of the reactions (Also see in col. 4, lines 30-44 and examples of Tsubakimoto et al.).

However, the Office is also of the opinion that even though Tsubakimoto does not disclose the percentage of heat loss of the present claims "it is reasonable that the percentages of heat loss would be the same as in the presently claimed process since the continuous process, as well as the mixing kneader, of the prior art process is essentially the same...." Applicants submit that the Office's assertion in this regard is entirely without foundation. The Office has articulated no grounds why it would be reasonable to make such an assumption. Moreover, as discussed above, Applicants have shown that the prior art kneader and the kneader of the present claims are not the same.

In view of the differences between the mixing kneader of the present claims and the kneader of the prior art, Applicants submit that the rejection is not supportable and should be withdrawn.

Claims 27-29

With respect to Claim 27, Applicants submit that Tsubakimoto does not describe or suggest axially parallel rotating shafts having one or more disk segments in a propeller fashion. Likewise, with respect to Claims 28 and 29, Tsubakimoto does not disclose a mixing kneader having axially parallel rotating shafts that comprise one or more close-clearance mixing bars or at least one of an L-shaped or U-shaped attachment.

In fact, Tsubakimoto discloses that the prior art rotary stirring shafts may have a sigma type, S-type, Banbury type or fish-tail type form (column 4, lines 11-14). An axially oriented rotating stirring shaft having an L-shaped or U-shaped transporting element is not disclosed.

Therefore, the subject matter of dependent Claims 27-29 is further distinguished from Tsubakimoto because Tsubakimoto does not disclose the particular structure of the axially parallel rotating shafts recited in Claims 27-29. Because Tsubakimoto does not disclose or suggest the limitations of dependent Claims 27-29, Tsubakimoto cannot anticipate or render the aforementioned claims obvious.

Claims 30-32

Claims 30-32 limit the residence time of the monomer mixture in the mixing kneader. For example, Claim 32 requires that the residence time of the monomer mixture in the mixing kneader is less than 10 minutes. Applicants submit that the mixing apparatus of Tsubakimoto is not capable with providing a low residence time. As stated above, the rotary stirring shafts identified as reference numeral 26 in Figures 4 and 5 of Tsubakimoto carry out a mixing function rather than a transporting function. For this reason, the subject matter of Claims 30-32 cannot be anticipated in view of Tsubakimoto.

In fact, Tsubakimoto discloses that the residence time of Example 1 is substantially greater than the residence time recited in any of present Claims 30-32. The process of

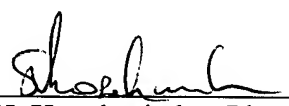
Tsubakimoto's Example 1 is carried out by adding a monomer mixture to a kneader. Polymerization proceeds 15 minutes after the addition of a polymerization initiator (see column 9, lines 3-7 and 16-18 of Tsubakimoto). The polymerization is then allowed to proceed for an additional 35 minutes (see column 9, line 23). Thus, the monomer mixture of Example 1 of Tsubakimoto must reside in the prior art kneader for at least 50 minutes (i.e., 15 minutes after addition of the monomer mixture to the kneader + an additional 35 minutes before discharge from the kneader). Such residence times certainly do not suggest the significantly shorter residence times of Claims 30-32, e.g., Claim 30 permits a maximum residence time of 30 minutes which is substantially shorter than the 50 minutes residence time of Example 1 of Tsubakimoto.

Applicants submit the fact that the residence time of Example 1 of Tsubakimoto is substantially longer than the residence time recited in any of Claims 30-32 is further evidence that the subject matter of Claims 30-32 is patentable over the prior art of record and is actually a "teaching away" from the presently claimed invention.

For the reasons discussed above, Applicants submit that the rejections of record are not supportable and should be withdrawn.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Stefan U. Koschmieder, Ph.D.
Registration No. 50,238

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

NFO:SUK\la

VIII. CLAIMS APPENDIX

Claims 1-9 (Canceled).

Claim 10 (Previously Presented): A process for the continuous production of crosslinked fine particles of an addition polymer gel, comprising

copolymerizing a monomer mixture, comprising

a) one or more water-soluble monoethylenically unsaturated monomers,

b) from 0.001 to 5 mol% based on the monomers (a) of one or more comonomers containing at least two ethylenically unsaturated groups, and

c) from 0 to 20 mol% based on the monomers (a) of one or more water-insoluble monoethylenically unsaturated monomers,

wherein the monomers a), b) and c) are present as a 20 to 80% by weight solution in water based on the total amount of a), b), and c), wherein the copolymerizing is carried out in the presence of initiator at from 0 to 140°C by continuously feeding the aqueous solution of the monomers into a mixing kneader having at least two axially parallel rotating shafts having a plurality of kneading and transporting elements to convey the monomer mixture from an upstream end of the mixing kneader in the axial direction toward a downstream end of the mixing kneader by the continuous conveying action of the transporting elements of the rotating shafts in the presence of one or more addition polymerization inhibitors under an inert gas.

Claim 11 (Original): The process of claim 10, wherein the monomer solution is conveyed through the mixing kneader with an inert gas.

Claim 12 (Original): The process of claim 10, wherein the aqueous solution of the monomers is fed to the mixing kneader together with an inert gas.

Claim 13 (Withdrawn): The process of claim 10, wherein the inert gas is wholly or partly generated by a chemical reaction in the mixing kneader.

Claim 14 (Withdrawn): The process of claim 13, wherein the inert gas is wholly generated by a chemical reaction in the mixing kneader.

Claim 15 (Original): The process of claim 10, wherein the process is carried out in the presence of water vapor.

Claim 16 (Original): The process of claim 10, wherein not less than 15% of the heat of reaction is removed by evaporation of water.

Claim 17 (Original): The process of claim 10, wherein not less than 25% of the heat of reaction is removed by evaporation of water.

Claim 18 (Original): The process of claim 10, wherein not less than 45% of the heat of reaction is removed by product discharge.

Claim 19 (Original): The process of claim 10, wherein not less than 55% of the heat of reaction is removed by product discharge.

Claim 20 (Original): The process of claim 10, wherein not less than 50% of the total heat of reaction is removed by product discharge and water evaporation.

Claim 21 (Original): The process of claim 10, wherein not less than 70% of the total heat of reaction is removed by product discharge and water evaporation.

Claim 22 (Original): The process of claim 10, wherein not less than 90% of the total heat of reaction is removed by product discharge and water evaporation.

Claim 23 (Previously Presented) The process of claim 10, wherein the fraction of heat removed by evaporation of water from the reaction mixture is not less than 5% of the heat of reaction and the fraction of heat removed by product discharge is not less than 25% of the heat of reaction and the remainder of the heat is removed via cooling of the reactor walls.

Claim 24 (Original): The process of claim 10, wherein no heat is removed via cooling of the reactor walls.

Claim 25 (Previously Presented): The process of claim 10, wherein the axially parallel rotating shafts of the mixing meter counter-rotate during the feeding.

Claim 26 (Previously Presented): The process of claim 10, wherein the axially parallel rotating shafts of the mixing meter comprise a combination of kneading and transporting elements.

Claim 27 (Previously Presented): The process of claim 10, wherein the axially parallel rotating shafts of the mixing meter comprise one or more disk segments in a propeller fashion.

Claim 28 (Previously Presented): The process of claim 10, wherein the axially parallel rotating shafts of the mixing kneader comprise one or more close-clearance mixing bars.

Claim 29 (Previously Presented): The process of claim 10, wherein the axially parallel rotating shafts of the mixing kneader comprise at least one of an L-shaped or U-shaped attachment.

Claim 30 (Previously Presented): The process of claim 10, wherein the residence time of the monomer mixture in the mixing kneader is less than 30 minutes.

Claim 31 (Previously Presented): The process of claim 10, wherein the residence time of the monomer mixture in the mixing kneader is less than 20 minutes.

Claim 32 (Previously Presented): The process of claim 10, wherein the residence time of the monomer mixture in the mixing kneader is less than 10 minutes.

Claim 33 (Previously Presented) The process of claim 10, wherein the residual monomer of the addition polymer gel is less than 0.15% by weight.

Claim 34 (Previously Presented) The process of claim 10, wherein the residual monomer of the addition polymer gel is less than 0.25% by weight.

Claim 35 (Previously Presented) The process of claim 10, wherein the residual monomer of the addition polymer gel is less than 0.30% by weight.

Claim 36 (Withdrawn): The process of claim 10, wherein no heat is removed through water evaporation.

IX. EVIDENCE APPENDIX

None.

X. RELATED APPEALS PROCEEDINGS

None.